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**PRELIMINARY ASSESSMENT/
VISUAL SITE INSPECTION**

**FORMER COSDEN OIL
AND CHEMICAL FACILITY
CALUMET CITY, ILLINOIS
ILD 091 766 410**

FINAL REPORT

Prepared for

**U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, DC 20460**

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EXECUTIVE SUMMARY

Dynamac Corporation (Dynamac) performed a preliminary assessment and visual site inspection (PA/VSI) to identify and assess the likelihood of releases from solid waste management units (SWMU) and other areas of concern (AOC) at the former Cosden Oil and Chemical Company (Cosden) facility in Calumet City, Illinois. This summary highlights the results of the PA/VSI and the potential for releases of hazardous wastes or hazardous constituents from SWMUs and AOCs identified.

From 1949 until 1989, the facility manufactured a variety of chemicals including formaldehyde, aqua ammonia, hexamethylenetetramine (hexamine), and polyethylene emulsion. From 1970 until 1990, the facility also manufactured polystyrene plastic. The chemical manufacturing processes generated non-hazardous process wastewater. During polystyrene plastic manufacturing, the facility generated hazardous waste including acrylonitrile waste (U009), process blow-down (D001), used sand bed filters (D001), and an ethylbenzene-styrene by-product (D001), and non-hazardous waste including process wastewater and waste sludge. The facility also generated non-hazardous waste oil from machinery maintenance.

All operations at the facility ceased in 1990. The facility generated numerous one-time wastes during dismantling activities from 1990 to the present. These one-time wastes were hazardous waste liquid containing freon (F002), waste residue (D001), asbestos-containing material, liquid polychlorinated biphenyl (PCB) oil, and used transformers and capacitors which formerly contained PCB oil.

The facility operated at its current location from 1949 until 1990. The facility occupies approximately 46 acres in a mixed industrial/residential area. During the 1980s, the facility employed about 35 people. One person is currently employed at the facility to supervise dismantling activities.

Cosden submitted a Notification of Hazardous Waste Activity to the U.S. Environmental Protection Agency (EPA) as a generator and a treatment, storage, and disposal facility in 1980. Cosden also submitted a Part A Permit Application (Part A) as a storage facility in 1980. The Part A identified the Old Drum Storage Area (SWMU 1), the Wastewater Treatment System (WWTS) (SWMU 3), and the Blow-Down Dump Pit Area (SWMU 6). In 1982 Cosden withdrew its Part A. There was no state or Federal file information regarding whether or not EPA or IEPA approved this request.

The facility constructed the New Drum Storage Area (SWMU 2) in 1981. There was no subsequent Part A identifying this unit in state, Federal, or facility files at the time of the VSI. Following IEPA-approved RCRA closure of this unit in 1984, the facility has been regulated by IEPA as a large-quantity generator storing waste on site for less than 90 days and does not require a RCRA permit.

The facility has undergone a number of ownership and operational changes. From 1949 until 1963, Spencer Chemical Company (Spencer) owned and operated the chemical manufacturing business at the facility. In 1963, Gulf Oil Corporation (Gulf) purchased the facility and continued the chemical manufacturing business. In 1968, Cosden purchased the facility and continued to manufacture solely chemicals until 1970.

In 1970, Cosden limited the chemical manufacturing business to include only polyethylene emulsion production, and expanded the facility to include polystyrene plastic manufacturing. Cosden continued these processes until 1977. In 1977, Rohm and Haas Corporation (RHC) purchased the equipment and process information for manufacturing polyethylene emulsion. RHC continued to manufacture polyethylene emulsion within the Cosden-owned facility. In 1989, RHC ceased all operations at this location.

Cosden continued polystyrene plastic manufacturing from 1977 until 1990. In 1990, Cosden, which had changed its name to Fina Oil and Chemical Company (Fina) in 1986, ceased all manufacturing operations at the facility. From 1990 to the present Fina has been dismantling the facility.

The PA/VSI identified the following six SWMUs and two AOCs at the facility:

Solid Waste Management Units

- 1 Old Drum Storage Area
- 2 New Drum Storage Area
- 3 Wastewater Treatment System (WWTS)
- 4 20,000-Gallon By-Product Aboveground Storage Tank (AST)
- 5 10,000-Gallon Waste Oil AST
- 6 Blow-Down Dump Pit Area

Areas of Concern

- 1 Former Styrene/Ethylbenzene AST Area
- 2 Acetone Soil and Ground Water Contamination Area

All facility SWMUs and AOCs are located outdoors. The potential for a release to ground water, surface water, on-site soils, and air from SWMUs 1 and 5 is low. SWMU 1 stored hazardous waste in closed 55-gallon drums and has been inactive since approximately 1981. There were no other release controls associated with this unit. There was no documentation in state or Federal files regarding whether this unit underwent RCRA closure. SWMU 5 managed waste in a 10,000-gallon steel AST in sound condition. In addition, SWMU 5 was located on a concrete pad surrounded by a 4-foot high concrete berm. There is no documentation in state, Federal, or facility files of a release or spill at either location.

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There was documentation of a release to ground water from SWMU 6 and AOC 2. A ground water sample collected in 1987 in the area of SWMU 6 revealed a level of 1.8 parts per million (ppm) styrene and 0.080 ppm ethylbenzene. SWMU 6 managed process blow-down (D001) from the former polystyrene suspension process building in a dirt-lined pit until 1981. A 1990 report documenting soil and ground water investigations at the facility stated that although the facility removed 1,000 cubic-yards of soil from this unit in 1989, trace amounts of chemicals still remained at depth. The report did not indicate what methods were used to determine the extent of contamination in this area or what type of chemicals remained at depth. A ground water sample collected near AOC 2 in 1987 revealed a level of 1.1 ppm acetone, 0.190 ppm 2-butanone, 0.033 ppm toluene, 0.027 ppm styrene, and 0.012 ppm carbon disulfide. There was no documentation in state, Federal or facility files regarding the source of this contamination, or whether the facility initiated any type of corrective action at this location.

The potential for a release to ground water from SWMUs 3 and 4, and from AOC 1 is high. Analysis of a soil sample collected in 1989 from an area centrally located between SWMUs 3 and 4 revealed levels of up to 2.5 ppm ethylbenzene and 8.5 ppm styrene. There was documentation of a release to the soil from AOC 1. There are sandy soils located throughout the facility and the depth to ground water is between 6 and 11 feet. The potential for a release to ground water from SWMU 2 is low. This unit manages waste in 55-gallon drums on wood pallets. The unit is located on a concrete pad surrounded by a 6-inch concrete berm.

There was documentation of a release to on-site soils from SWMU 6 and AOCs 1 and 2. Soil vapor analysis of soil samples collected in 1987 at these locations indicated the presence of ethylbenzene and styrene. Soil samples collected in 1989 in the area of SWMU 6 revealed levels of up to 47 ppm ethylbenzene and up to 15 ppm styrene. Although the facility excavated and removed 1,000-cubic yards of soil from this unit, trace amounts of chemicals still remained at depth. Analysis of a soil sample collected in 1989 from an area located immediately north of AOC 1 revealed a level of 7.1 ppm ethylbenzene. Analysis of a soil sample collected in the area of AOC 2 revealed a level of 1.6 ppm acetone.

There was no information in state, Federal, or facility files regarding whether the facility initiated any type of corrective action in response to the documented contamination in the above-mentioned areas. There was no information available regarding other documented releases to environmental media from the facility at the time of the VSI.

The potential for a release to on-site soils from SWMU 3 and 4 is high. Until 1980, SWMU 3 managed waste in two dirt-lined pits. SWMU 4 managed waste in a steel AST on a gravel pad surrounded by a gravel berm. As previously mentioned, analysis of a soil sample collected in 1989 from an area centrally located between SWMUs 3 and 4 revealed levels of up to 2.5 ppm ethylbenzene and 8.5 ppm styrene. The potential for a release to on-site soils from SWMU 2 is low. Soil vapor monitoring conducted in this area in 1987 indicated the presence of ethylbenzene and styrene. However, analysis of soil samples collected in 1989 at depths ranging from 1.5 feet to 9 feet did not reveal contamination.

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There was a documented release to the air from SWMU 2. During the VSI, Dynamac observed an open 55-gallon drum containing waste residue (D001), which has volatile constituents.

The potential for a release to the air from SWMU 6 is high. SWMU 6 was an open pit located outdoors that managed waste containing volatile contaminants. The potential for a release to air from AOCs 1 and 2 is moderate. As described previously, soil and/or ground water samples collected in these areas revealed the presence of significant levels of volatile contaminants. The potential for a release to air from SWMUs 3 and 4 is low. SWMU 3 managed only non-hazardous waste and waste liquid containing freon. SWMU 4 managed waste in closed steel tanks and has been inactive since 1990. Although there has been documentation of soil contamination in an area centrally located between SWMUs 3 and 4, there is no documentation that a spill or release occurred at these units.

The potential for a release to surface water from SWMUs 2, 3, 4, and 6, and from AOCs 1 and 2 is moderate. As described previously, there was documentation of soil and/or ground water contamination at SWMUs 3, 4, and 6, and at AOCs 1 and 2. There are sandy soils located throughout the facility and the depth to ground water is between 6 and 11 feet. The ground water in the area of the facility discharges to the Little Calumet River, which serves as the north border of the facility. In addition, SWMUs 2, 3, and 6, and AOC 1 are located within the 100-year flood plain of the Little Calumet River. These areas are not designed to withstand a 100-year flood.

During the VSI, a facility representative stated that a fire at the facility in 1978 destroyed a large part of the polystyrene suspension process building. No further details or documentation of this event was available during the VSI.

The facility is located in a mixed industrial/residential area in Calumet City, Illinois, which has a population of approximately 37,840 persons. The facility is fenced on the east, south, and west sides. The Little Calumet River serves as the north border of the facility and is used for recreational and industrial purposes. Industrial uses for the Little Calumet River include intake use and transportation. The Little Calumet River is not used for drinking water purposes. There are no longer any additional security protection measures at the facility as operations have ceased and most buildings are empty. The nearest residents are located approximately one-half mile southwest of the facility.

A 15-acre wetland is located immediately west (upstream) of the facility. This wetland consists of a forested area containing emergent vegetation and having surface water present for extended periods during the growing season. There is a similar 2-acre wetland located approximately one-third mile downstream of the facility. Other sensitive environments within 2 miles include approximately 40 small mapped wetland areas. Approximately 10 of these wetland areas exceed 10 acres in size, and the remainder are

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primarily less than 1-acre in size. Ground water use in the area is minimal. There are no ground water wells used as drinking water supplies in Calumet City. Calumet City purchases drinking water from the City of Chicago, which obtains water from surface water intakes on Lake Michigan. There are a few ground water wells within city limits used for industrial purposes such as watering grounds.

Dynamac recommends the facility conduct RCRA closure of SWMUs 1, 3, and 6. Dynamac recommends the facility also conduct further soil and ground water sampling in the area of SWMUs 3 and 4, and conduct remediation, if necessary. Dynamac recommends the facility conduct and provide documentation of remediation associated with documented releases from SWMU 6, and AOCs 1 and 2. Dynamac also recommends that the facility protect SWMUs 2, 3, and 6, from a 100-year flood, and that the facility close the 55-gallon drums in SWMU 2 to prevent volatile contaminants from releasing to the air. Finally, Dynamac recommends that IEPA obtain the results of any further remediation activities at the facility to verify that all required remediation at the facility is accomplished.

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1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), received Work Assignment No. R05032 from the U.S. Environmental Protection Agency (EPA) under Contract No. 68-W9-0006 (TES 9) to conduct preliminary assessments (PA) and visual site inspections (VSI) of hazardous waste treatment and storage facilities in EPA Region 5. PRC assigned Dynamac Corporation (Dynamac), its TES 9 subcontractor, to conduct the PA/VSI for the former Cosden Oil & Chemical (Cosden) facility in Calumet City, Illinois.

As part of the EPA Region 5 Environmental Priorities Initiative, the RCRA and CERCLA programs are working together to identify and address RCRA facilities that have a high priority for corrective action using applicable RCRA and CERCLA authorities. The PA/VSI is the first step in the process of prioritizing facilities for corrective action. Through the PA/VSI process, enough information is obtained to characterize a facility's actual or potential releases to the environment from solid waste management units (SWMU) and areas of concern (AOC).

A SWMU is defined as any discernible unit at a RCRA facility in which solid wastes have been placed and from which hazardous constituents might migrate, regardless of whether the unit was intended to manage solid or hazardous waste.

The SWMU definition includes the following:

- RCRA-regulated units, such as container storage areas, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, and underground injection wells
- Closed and abandoned units
- Recycling units, waste water treatment units, and other units that EPA has generally exempted from standards applicable to hazardous waste management units
- Areas contaminated by routine and systematic releases of wastes or hazardous constituents. Such areas might include a wood preservative drippage area, a loading-unloading area, or an area where solvent used to wash large parts has continually dripped onto soils.

An AOC is defined as any area where a release to the environment of hazardous waste or constituents has occurred or is suspected to have occurred on a non-routine and nonsystematic basis. This includes any area where such a release in the future is judged to be a strong possibility.

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The purpose of the PA is as follows:

- Identify SWMUs and AOCs at the facility.
- Obtain information on the operational history of the facility.
- Obtain information on releases from any units at the facility.
- Identify data gaps and other informational needs to be filled during the VSI.

The PA generally includes review of all relevant documents in files located at state offices and at the EPA Region 5 office in Chicago.

The purpose of the VSI is as follows:

- Identify SWMUs and AOCs not discovered during the PA.
- Identify releases not discovered during the PA.
- Provide a specific description of the environmental setting.
- Provide information on release pathways and the potential for releases to each medium.
- Confirm information obtained during the PA regarding operations, SWMUs, AOCs, and releases.

The VSI includes interviewing appropriate facility staff, inspecting the entire facility to identify all SWMUs and AOCs, photographing all SWMUs, identifying evidence of releases, initially identifying potential sampling locations, and obtaining all information necessary to complete the PA/VSI report.

This report documents the results of the PA/VSI of the former Cosden facility located in Calumet City, Illinois, EPA ID No. ILD 091 766 410. The PA was completed on December 19, 1991. Dynamac gathered and reviewed information from files at the Division of Land Pollution Control and the Division of Water Pollution Control at the Illinois Environmental Protection Agency (IEPA) Springfield, Illinois office and from EPA Region 5 RCRA files.

Russ Crittenden and Deborah Hall of Dynamac conducted the VSI on February 12, 1992. The VSI included an interview with John Spice, Manager of Engineering and Maintenance at the facility. The VSI also included a walk-through inspection of the facility. Dynamac observed six SWMUs and two AOCs during the VSI.

The VSI is summarized along with nine inspection photographs in Attachment A. Field notes from the VSI are included in Attachment B.

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2.0 FACILITY DESCRIPTION

This section describes the facility's location, past and present operations (including waste management practices), waste generating processes, history of documented releases, regulatory history, environmental setting, and receptors.

2.1 FACILITY LOCATION

The former Cosden facility is located at 142nd and Paxton Avenue in Calumet City, Cook County, Illinois (latitude 41° 36' 00" N and longitude 87° 32' 00" W) (Cosden, 1980b), as shown in Figure 1. The facility occupies approximately 46 acres in a mixed industrial/residential area (HSA, undated). The facility is bordered on the west by the Calumet Expressway, across from which is a wetland, and on the north by the Little Calumet River, across from which is a municipal landfill. The B & O Railroad tracks serve as the south border of the facility, across from which lies a vacant lot. The Ashland Chemical facility serves as the east border of the facility.

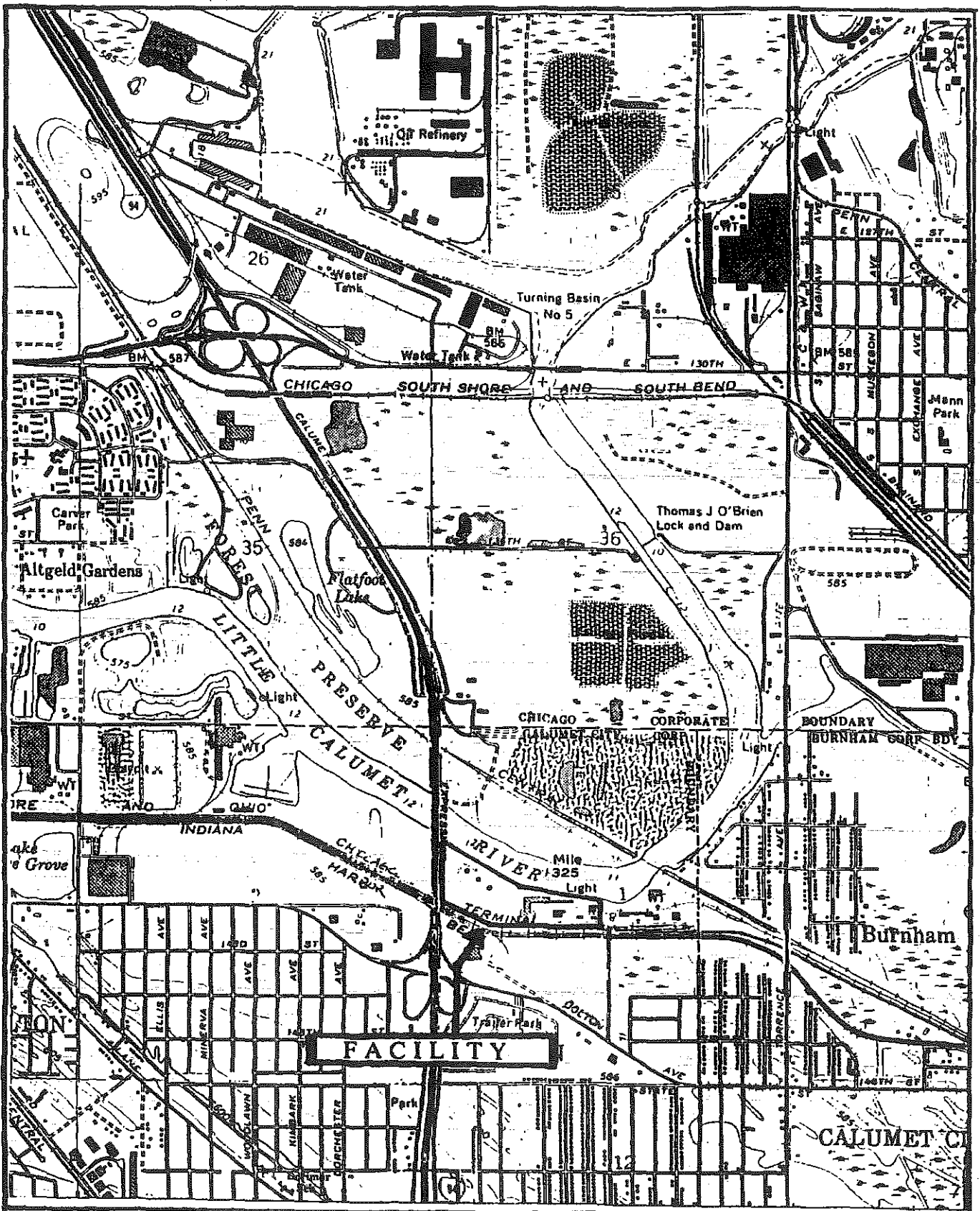
2.2 FACILITY OPERATIONS

From 1949 until 1989, the facility manufactured a variety of chemicals including formaldehyde, aqua ammonia, hexamethylenetetramine (hexamine), and polyethylene emulsion. From 1970 until 1990, the facility also manufactured polystyrene plastic.

The facility has undergone a number of ownership and operational changes since its first industrial use in 1949. From 1949 until 1963, Spencer Chemical Company (Spencer) owned the facility and operated a chemical manufacturing business. In 1963, Gulf Oil Corporation (Gulf) purchased the facility and continued the chemical manufacturing business. Gulf sold the facility to Cosden in 1968. Cosden continued to operate the facility solely as a chemical manufacturing business until 1970.

In 1970, Cosden dramatically reduced its chemical manufacturing business to include only polyethylene emulsion production, and expanded the facility to include polystyrene plastic manufacturing. Cosden continued to manufacture both polyethylene emulsion and polystyrene plastic until 1977. In 1977, Rohm and Haas Corporation (RHC) purchased the equipment and process information for manufacturing polyethylene emulsion. RHC continued to manufacture polyethylene emulsion within the Cosden-owned facility until 1989, when RHC ceased all operations at this location.

Cosden continued polystyrene plastic manufacturing from 1977 until 1990. In 1990, Cosden, which had changed its name to Fina Oil and Chemical Company (Fina) in 1986, ceased all manufacturing operations at the facility. From 1990 to the present Fina has been dismantling the facility.



SCALE= 1 : 24,000

SOURCE: Modified from USGS, 1968

FIGURE 1
FACILITY LOCATION

During the 1980s, the facility employed approximately 35 people. One person is currently employed at the facility to supervise dismantling activities. Dismantling activities are anticipated to be completed in March or April of 1992. The New Drum Storage Area (SWMU 2) is the only waste management unit currently in use for accumulation of waste generated from dismantling activities. The remaining SWMUs at the facility are currently inactive.

The materials used in the chemical manufacturing business at the facility from 1949 until 1989 included methanol, ammonia, and liquid ethylene gas. The facility stored these materials in aboveground storage tanks (ASTs) located throughout the facility (HSA, undated). The facility generated non-hazardous process wastewater from the chemical manufacturing business.

From 1970 until approximately 1980, the facility manufactured polystyrene using a suspension process. The materials used in this process include liquid styrene monomer, butyldiene rubber, and ethylbenzene. For several months in 1980, the facility also used the polystyrene suspension process to manufacture polystyrene co-polymers containing acrylonitrile. The facility routinely generated process blow-down (D001), non-hazardous process wastewater, and non-hazardous waste sludge from the polystyrene suspension process. The facility also generated an acrylonitrile waste (U009) during polystyrene co-polymer production.

From 1978 until 1990, the facility manufactured polystyrene using a continuous process. The material used in this process included liquid styrene monomer, butyldiene rubber, ethylbenzene, and sand bed filters. The facility routinely generated used sand bed filters (D001) and an ethylbenzene-styrene by-product (D001) during this process. The facility stored the materials used in each of these processes in one of six ASTs located in the western part of the facility. The facility stored the polystyrene pellets manufactured from these processes in one of 22 pellet silos located east of the New Drum Storage Area (SWMU 2) (HSA, undated).

The facility also generated numerous one-time wastes during dismantling activities from 1990 to the present. These wastes include hazardous waste liquid containing freon (F002), waste residue (D001), and several special wastes including asbestos-containing material (ACM), liquid polychlorinated biphenyl (PCB) oil, and used transformers and capacitors which formerly contained PCB oil.

From at least 1978 until 1990, the facility also generated non-hazardous waste oil from machinery maintenance during the polystyrene suspension and polystyrene continuous processes.

There are six SWMUs at the facility. SWMU 1 (Old Drum Storage Area) is located in the southwest corner of the facility and managed all drummed waste at the facility prior to 1981. SWMU 2 (New Drum Storage Area) is located north of the polystyrene continuous process unit and managed hazardous waste from the polystyrene continuous process and dismantling activities, and the used capacitors which formerly contained PCB oil. SWMU 3 (Wastewater Treatment System (WWTs)) is located east of the polystyrene continuous process unit and managed non-hazardous process wastewater from chemical and polystyrene plastic manufacturing, and hazardous waste liquid containing freon (F002) from dismantling activities. SWMU 4 (20,000-Gallon By-Product AST) is located south of the styrene monomer ASTs and managed a hazardous by-product (D001) from the polystyrene continuous process. SWMU 5 (10,000-Gallon Waste Oil AST) is located north of the former formaldehyde manufacturing building and managed non-hazardous waste oil from machinery maintenance at the facility. SWMU 6 (Blow-Down Dump Pit Area) is located immediately south of the former polystyrene suspension process building and accumulated hazardous process blow-down waste (D001) from the polystyrene suspension process.

Facility wastes and SWMUs are discussed in detail in Section 2.3. Facility SWMUs are identified in Table 1. The facility layout, including SWMUs and AOCs, is shown in Figure 2.

2.3 WASTE GENERATING PROCESSES

According to John Spice of Fina, the primary waste stream generated during the chemical manufacturing processes at the facility was non-hazardous process wastewater. The primary waste streams generated during polystyrene plastic manufacturing at the facility were process blow-down (D001), used sand bed filters (D001), ethylbenzene-styrene by-product (D001), acrylonitrile waste (U009), and non-hazardous process wastewater and waste sludge. The facility also generated hazardous waste liquid containing freon (F002), waste residue (D001), and special wastes including ACM waste, PCB oil, and used transformers and capacitors which formerly contained PCB oil during dismantling activities. In addition, the facility generated non-hazardous waste oil during machinery maintenance. Wastes generated at the facility are discussed below and are summarized in Table 2. Annual generation rates presented are based on information provided by Mr. Spice, Manager of Engineering and Maintenance, Fina, and 1990 waste generation data.

The facility used the polystyrene suspension process from about 1970 to 1981. This process consisted of batch mixing and heating styrene monomer and butyladiene rubber with ethylbenzene. The facility routinely generated process blow-down (D001), non-hazardous process wastewater, and non-hazardous waste sludge from the polystyrene suspension process. For several months in 1980, the facility also used this process to manufacture polystyrene co-polymers containing acrylonitrile. The facility generated an acrylonitrile waste (U009) during polystyrene co-polymer production (Cosden, 1980b). There was no file information or facility records available concerning how the facility generated the acrylonitrile waste.

TABLE 1
SOLID WASTE MANAGEMENT UNITS (SWMU)

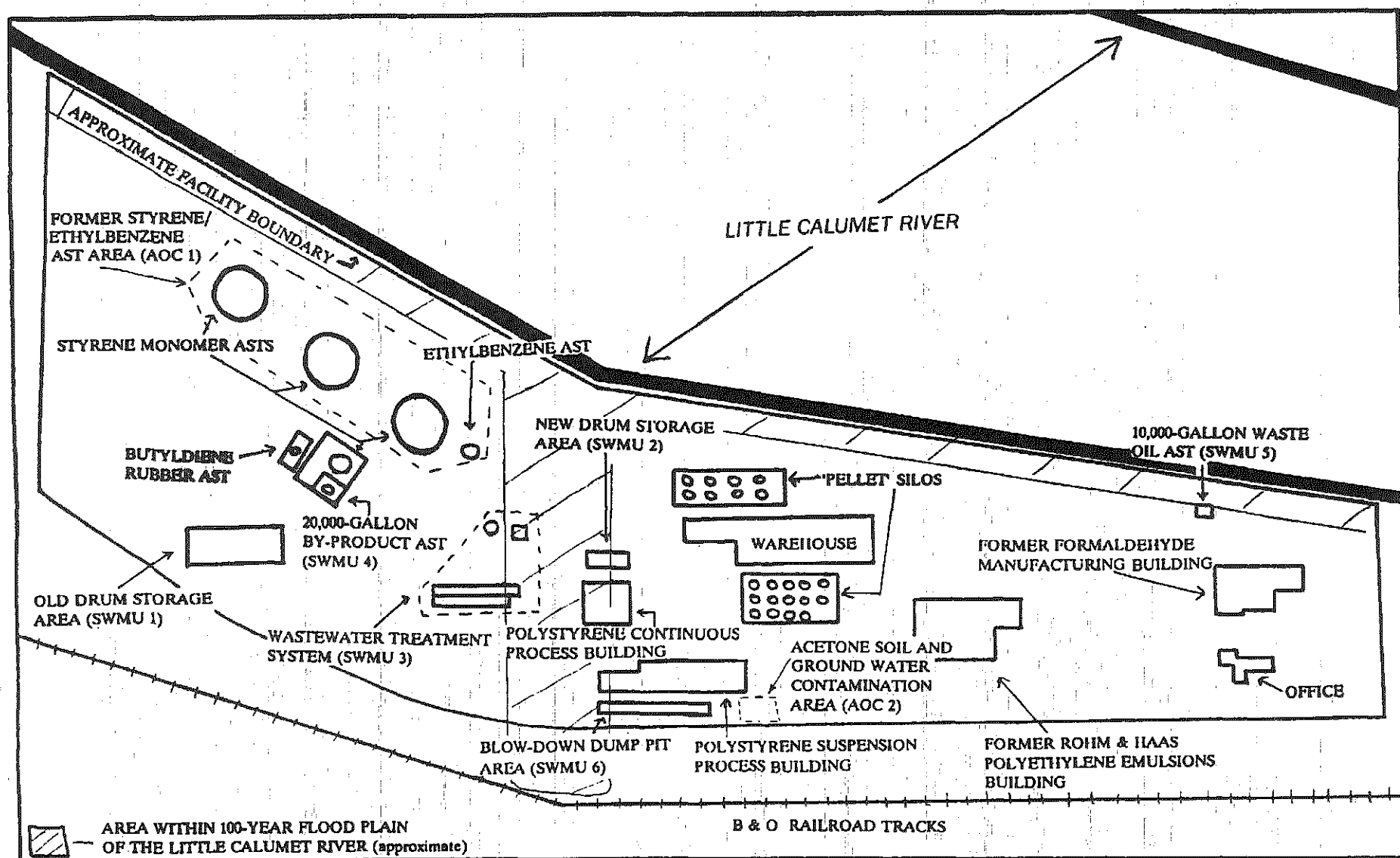
SWMU Number	SWMU Name	RCRA Hazardous Waste Management Unit*	Status
1	Old Drum Storage Area	Yes	Inactive ²
2	New Drum Storage Area	Yes	RCRA Closed 1984; Active for less than 90-day storage of hazardous wastes.
3	WWTS	Yes ¹	Active ²
4	20,000-Gallon By-Product AST	No	Inactive
5	10,000-Gallon Waste Oil AST	No	Inactive
6	Blow-Down Dump Pit Area	Yes	Inactive ²

* A RCRA hazardous waste management unit is one that currently requires or formerly required submittal of a RCRA Part A or Part B permit application.

¹ Cosden anticipated that the waste analysis of process wastewater and waste sludge managed by this unit would indicate the waste was hazardous. For this reason, Cosden identified this unit as a hazardous waste management unit on its Part A. Cosden did not receive information indicating the waste was non-hazardous until after the Part A had been submitted to the EPA.

² There was no file information or facility records available documenting that these units underwent IEPA-approved RCRA closure or that EPA/IEPA approved of the facility's withdrawal of protective filing status of this unit. The facility's approved closure plan only addresses the New Drum Storage Area (SWMU 2). In addition, IEPA-approved RCRA closure of the facility in 1984 covers only SWMU 2.

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SCALE (approximate) = 1 : 2,500

SOURCE: modified from HSA, undated



FIGURE 2
FACILITY LAYOUT

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**TABLE 2
SOLID WASTES**

Waste/EPA Waste Code	Source	Primary Management Unit *
Process Wastewater/ NA**	Polystyrene Suspension Process; Chemical Manufacturing Processes	3
Process Blow-Down/ (D001)	Polystyrene Suspension Process	6
Used Sand Bed Filters/ (D001)	Polystyrene Continuous Process	2
Ethylbenzene-Styrene/ By-Product (D001)	Polystyrene Continuous Process	4
Acrylonitrile Waste/ (U009)	Polystyrene Suspension Process	1
Waste Sludge/ NA**	Polystyrene Suspension Process	3
Waste Oil/ NA**	Machinery Maintenance	5
Hazardous Waste Liquid Containing Freon/ (F002)	Dismantling Activities	3, 2
Waste Residue/ (D001)	Dismantling Activities	2
ACM Waste/ NA**	Dismantling Activities	None
Liquid PCB Oil/ NA**	Dismantling Activities	None
Used Transformers and Capacitors/ NA**	Dismantling Activities	2

* Primary management unit refers to the SWMU that currently manages or formerly managed the waste.

** Nonapplicable (NA) designates non-hazardous waste.

From 1970 until 1981, the facility generated process blow-down (D001) when the rate of polymerization associated with the polystyrene suspension process was too high and pressure-release plates in the process vats failed automatically as a safety precaution. Process blow-down consisted of suspension water which contained detergent, liquid styrene monomer, butyldiene rubber, ethylbenzene, and polystyrene plastic. The process blow-down was discharged to SWMU 6 (Blow-Down Dump Pit Area). There was no file information or facility records available concerning the quantity of this waste generated at the facility. Mr. Spice stated that this waste was transported off site to a local landfill, but he could not recall the name of the landfill or of the transporter.

The facility treated non-hazardous process wastewater and waste sludge in SWMU 3 (WWTS) (Cosden, 1982b). The facility used lime to neutralize the pH of the wastewater in the equalizing basin. The wastewater went through a water clarifier, and then suspended particles from the wastewater settled out in one of two sludge basins. The facility discharged the treated wastewater to the Metropolitan Sanitary District of Greater Chicago (MSDGC) (permit No. 69-876) (Cosden, 1980b). There was no file information available concerning the quantity of wastewater treated at the facility. The facility generated about 29,940 pounds of waste sludge annually. The waste sludge was transported off site to Liquid Waste Disposal (LWD), Inc., in Calvert City, Kentucky, for incineration. There were no facility records concerning the transporter of this waste available at the time of the VSI.

For several months in 1980, the facility used acrylonitrile in the polystyrene suspension process. During this time, the facility managed approximately 60,000 gallons of acrylonitrile waste (U009) in SWMU 1 (Old Drum Storage Area) (Cosden, 1982b). There was no file information or facility records available concerning the final disposition of this waste.

The facility used the polystyrene plastic continuous process from 1978 until 1990. This process consisted of dissolving butyldiene rubber in liquid styrene monomer and pumping the polymerized product through a die into strands. Small amounts of ethylbenzene controlled the rate of polymerization and sand bed filters removed any unknown impurities from the product. The facility bled off some of the reaction material containing styrene and ethylbenzene to control the rate of polymerization. The facility die cut the strands into one-eighth-inch pellets. The facility routinely generated used sand bed filters (D001) and an ethylbenzene-styrene by-product (D001) during this process.

The facility stored used sand bed filters (D001) in 55-gallon drums in SWMU 2 (New Drum Storage Area). The facility generated approximately 39,000 gallons of used sand bed filters annually. The waste was transported off site to LWD, Inc., in Calvert City, Kentucky, for incineration. There was no file information or facility records available concerning the transporter of this waste.

The facility accumulated ethylbenzene-styrene by-product (D001) in SWMU 4 (20,000-Gallon By-Product AST). The facility generated approximately 10,000 gallons of this waste annually. The facility transported the ethylbenzene-styrene by-product off site to a Fina-owned facility in Arkansas for recycling. There was no file information or facility records available concerning the transporter of this waste.

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The facility generated approximately 65,550 gallons hazardous waste liquid containing freon (F002) from clean-up of the WWTS and its interconnecting pipes. Mr. Spice stated he does not know where the freon came from and that the normal wastewater in the WWTS was non-hazardous. The facility containerized approximately 550 gallons of this waste in 55-gallon drums stored in SWMU 2 (New Drum Storage Area) during the one time clean-up. The remaining 65,000 gallons of the waste was transferred from the sludge basins directly to tank trucks. All of the waste was transported off site to LWD, Inc., in Calvert City, Kentucky, for incineration. There was no file information or facility records available concerning the transporter of this waste.

The facility is currently generating waste residue containing styrene monomer, ethylbenzene, and waste oil (D001) from dismantling the polystyrene continuous process unit. This waste is stored in 55-gallon drums in SWMU 2 (New Drum Storage Area). The facility expects that less than 700 gallons of this waste will be generated during this one time clean-up.

The facility hired a contractor to conduct an ACM removal in 1990. Mr. Spice could not provide information concerning the amount of ACM waste generated during the removal activities. Mr. Spice stated that the ACM waste was transported directly off site to the CID Landfill, in Calumet City. There was no file information or facility records available concerning the transporter of this waste.

The facility generated approximately 2,700 gallons of liquid PCB oil from draining all PCB-containing transformers and capacitors at the facility. The waste was transferred directly into a tank truck which transported the waste to Aptus, Inc., in Coffeyville, Kansas for incineration. There was no file information or facility records available concerning the transporter of this waste.

Used transformers were transferred directly off site to S.D. Meyers, Inc., in Tallmadge, Ohio for disposal. The used transformers were not managed by any facility SWMUs. The facility stored used capacitors in SWMU 2 (New Drum Storage Area) before they were transported off site to S.D. Meyers for disposal. The facility generated approximately 59,000 pounds of this waste during the one time clean-up. There was no file information or facility records available concerning the transporter of this waste.

In addition, the facility generated non-hazardous waste oil from machinery maintenance. The facility managed this waste in SWMU 5 (10,000-Gallon Waste Oil AST). The facility generated approximately 500 gallons of this waste annually until 1990, when all manufacturing operations at the facility ceased. This waste was transported off site for recycling about every six months. There was no file information or facility records available concerning the transporter or recycler of this waste.

2.4 HISTORY OF DOCUMENTED RELEASES

This section discusses the history of documented releases to ground water, surface water, air, and on-site soils at the facility.

During the VSI, Mr. Spice stated that a fire at the facility in 1978 destroyed a large part of the polystyrene suspension process building. There was no file information or facility records available describing the fire or any potential releases from the fire to surrounding environmental media. Mr. Spice also stated the facility spilled between 5 and 10 gallons of liquid styrene monomer into the Little Calumet River on two occasions. Mr. Spice did not recall the dates of the incidents, but said that the facility notified the U. S. Coast Guard at the time of each incident.

The facility hired ERT, Inc., to conduct an investigation of potential contaminants at the facility in 1987, and ENSR Constructors (ENSR) to conduct further investigations at the facility in 1989. A summary of the investigations is provided as follows.

The contractors installed a total of 10 monitoring wells at depths of up to 11 feet at the facility. ERT conducted soil vapor monitoring at 48 locations at the facility. The soil vapor monitoring results were qualitative; their purpose was to determine if any VOCs were present at a given location. ERT classified the soil vapor monitoring results as high, moderate, or low levels for a given contaminant. Soil vapor monitoring in the areas of SWMUs 1, 2, 3, 4, and 6 indicated high levels of styrene and ethylbenzene. Soil vapor monitoring indicated low levels of contaminants in other areas at the facility (ERT, 1988).

Soil samples collected throughout the facility during the 1987 and 1989 investigations revealed significant levels of contamination in several areas. One soil sample indicated levels of 2.3 parts per million (ppm) ethylbenzene and 4.8 ppm styrene near SWMU 6 (ERT, 1988). However, a duplicate sample indicated levels of ethylbenzene that were below the detection limit and 0.097 ppm styrene at the same location. Soil samples collected in an area centrally located among SWMUs 3, 4, and 6 revealed levels of up to 2.5 ppm ethylbenzene and up to 8.5 ppm styrene. One soil sample collected near the Former Styrene/Ethylbenzene AST Area (AOC 1) revealed a level of 7.1 ppm ethylbenzene, and one soil sample collected near the Acetone Soil and Ground Water Contamination Area (AOC 2) indicated a level of 1.6 ppm acetone (ENSR, 1990a; ENSR, 1990b).

Ground water samples collected at the facility during the investigations indicated levels of up to 1.8 ppm styrene and 0.080 ppm ethylbenzene in the area of SWMU 6 and 1.1 ppm acetone, 0.190 ppm 2-butanone, 0.033 ppm toluene, 0.027 ppm styrene, and 0.012 ppm carbon disulfide near the Acetone Soil and Ground Water Contamination Area (AOC 2). Ground water samples collected at other locations within the facility did not reveal contamination (ERT, 1988).

File information does not indicate whether state or Federal agencies were present for, or approved of, the above-mentioned investigation activities, or whether the facility initiated any further corrective action.

In May 1989, ENSR collected 6 soil samples to determine the nature and extent of contamination at the Blow Down Dump Pit Area (SWMU 6) (ENSR, 1990a). This unit is located immediately south of the former polystyrene suspension process building. Prior to 1980, the unit contained a dirt-lined pit which received process blow-down (D001) from the polystyrene suspension process. The facility constructed a concrete pit in the area adjacent to the dirt-lined pit in 1980. Analysis of the soil samples collected in the area which formerly contained the dirt-lined pit indicated levels of up to 47 ppm ethylbenzene and up to 15 ppm styrene. Based upon these results, ENSR excavated and removed approximately 1,000 cubic-yards of soil to a depth of 4 feet. ENSR then backfilled the excavated area with clean fill. A report by ENSR stated that following remediation, traces of chemicals still remained at depth. The report did not indicate what methods ENSR used to determine the extent of contamination, what type of chemicals remained at depth, or the depth to which ENSR was referring (ENSR, 1990a). File information does not indicate whether state or Federal agencies were present for, or approved of, removal activities, or whether the facility initiated any further corrective action in this area.

2.5 REGULATORY HISTORY

Cosden submitted a notification of hazardous waste activity (Notification) to EPA on August 14, 1980 (Cosden, 1980a). Cosden submitted a RCRA Part A permit application (Part A) on November 17, 1980 (Cosden, 1980b). The Part A identified the Old Drum Storage Area (SWMU 1) as its designated container storage (S01) unit, and the WWTS (SWMU 3), Blow-Down Dump Pit Area (SWMU 6), and a 16,000 AST as its designated tank storage (S02) units (total S02 capacity was listed as 394,000 gallons). The 16,000-gallon steel AST identified in the Part A was designed to receive waste from potential spills of acrylonitrile waste at the facility. In a November 30, 1982, letter to the U.S. EPA, Cosden explained that this AST had never been used and, therefore, was not a waste management unit (Cosden, 1982b).

The Part A listed the facility as annually generating a total of approximately 95,000 pounds of U009 waste and 30,000 pounds of D001 waste. The Part A listed additional unknown quantities of U009; D007, D008, and U009; and D007 and U009 wastes, as well. In a November 30, 1982, letter to the U.S. EPA, Cosden requested that their Part A be withdrawn. The letter stated that Cosden's Part A was over protective in anticipation that analysis of the facility's waste streams would reveal that each waste stream was a RCRA hazardous waste. Many waste streams listed in the Part A were later determined to be non-hazardous. The letter also stated that the facility did not plan to store wastes at the facility for greater than 90 days (Cosden, 1982b).

The facility constructed the New Drum Storage Area (SWMU 2) in 1981. There was no subsequent Part A identifying this unit available in state, Federal, or facility files at the time of the VSI. An Illinois Environmental Protection Agency (IEPA) RCRA closure inspection of the facility on September 21, 1984, revealed that closure activities of the New Drum Storage Area (SWMU 2) were conducted in accordance with the approved closure

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plan for the unit (IEPA, 1984). There was no file information or facility records available documenting that the SWMUs identified in the Part A underwent IEPA-approved RCRA closure. Following the 1984 closure inspection, the facility has been regulated by IEPA as a large-quantity generator storing wastes on site for less than 90 days.

IEPA conducted three RCRA-compliance inspections at the facility from 1982 to 1987. A March 1982 inspection revealed that a closure plan for the hazardous waste management units at the facility was not available (IEPA, 1982a; IEPA, 1982b). Cosden submitted a closure plan for the New Drum Storage Area (SWMU 2) to the IEPA on May, 3, 1982 (Cosden, 1982a). According to a May 4, 1982, IEPA Inspection Review Form, the apparent violations at the facility had been resolved at that time (IEPA, 1982c). Subsequent RCRA inspections of the facility by IEPA in September 1986 and April 1987 determined that there were no apparent violations at the facility at the time of each inspection (IEPA, 1986a; IEPA, 1986b; IEPA, 1987a; IEPA, 1987b).

There is no documentation that the facility was required to have operating air permits. The facility has no history of complaints from area residents.

The facility did not have any direct discharges to surface water and therefore was not required to have a National Pollutant Discharge Elimination System permit. The facility did have a sanitary sewer pretreatment discharge permit (No. 69-876) to discharge to the MSDGC (Cosden, 1980b). Under this permit, the facility operated the WWTS (SWMU 3) to pre-treat process wastewater prior to discharge to the MSDGC. There was no file information or facility records available concerning the quantity of wastewater treated by the facility, whether the facility was required to monitor its MSDGC discharge, or whether the facility's discharge permit has expired.

In 1985, the EPA Field Investigation Team conducted a Screening Site Investigation (SSI) at the facility to gather information to determine a preliminary Hazard Ranking Score for the facility. The SSI concluded the facility had a low priority for further investigations due to a lack of significant human receptors in the area. There is no documentation of any other Superfund activity at the facility.

2.6 ENVIRONMENTAL SETTING

This section describes the climate, flood plain and surface water, geology and soils, and ground water in the vicinity of the facility.

2.6.1 Climate

The facility is located approximately 30 miles southeast of O'Hare International Airport, the nearest National Weather Service office. The climate in this area is continental with cold winters and warm summers. Lake Michigan, located approximately six miles northeast of the facility has a moderating influence on temperature extremes. The average

annual daily temperature is 49.2° fahrenheit (F). The highest average daily temperature is 73.0° F in July, and the lowest average daily temperature is 21.4° F in January (NOAA, 1990).

Mean annual precipitation is 33.34 inches (NOAA, 1990). Mean annual lake evaporation is approximately 30 inches and net annual precipitation is approximately 3 inches. The one-year 24-hour maximum rainfall is approximately 2.4 inches (NOAA, 1979). Average wind speed and direction is west-southwest at 10 miles per hour. The wind is strongest in April, blowing at an average of 12 miles per hour from the west-southwest (NOAA, 1990).

2.6.2 Flood Plain and Surface Water

The majority of the facility is in an area of minimal flooding. A portion of the facility lies within the 100-year flood plain of the Little Calumet River. This portion of the facility includes the area approximately 50 feet inward from the Little Calumet River along the north border of the facility. This also includes an area approximately 100 feet wide that extends south from the river to the B & O Railroad tracks along the south border of the facility (FEMA, 1980) (See Figure 2 for approximate location of 100-year flood plain). Portions of the New Drum Storage Area (SWMU 2), the WWTS (SWMU 3), and the Blow-Down Dump Pit Area (SWMU 6) are located within this area. None of these SWMUs were designed to withstand a flood.

The nearest surface water body, the Little Calumet River, forms the north border of the facility and is used for recreational and industrial purposes (E & E, 1985). Industrial uses for the Little Calumet River include cooling water intakes and transportation (IEPA, 1992). The Little Calumet River is not used for drinking water. This surface water body discharges to Lake Michigan via the Calumet River.

Surface water drainage at the facility is toward a storm drain centrally located between the New Drum Storage Area (SWMU 2) and the WWTS (SWMU 3). The storm drain discharges to the Little Calumet River and is not regulated under a National Pollution Discharge Elimination System (NPDES) permit.

Other surface water bodies in the area include the Calumet River and Lake Calumet, each located approximately three miles north of the facility. Lake Calumet and the Calumet River are used for both recreational and industrial purposes. Industrial uses for Lake Calumet include non-contact wastewater discharge and transportation. Industrial uses for the Calumet River include intake use and wastewater discharge (IEPA, 1992). There are also wetland areas located within the facility property and in the surrounding area (USGS, 1968).